IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Confirmation No.: 4637

Kingo SUZUKI et al. Group Art Unit: 2814

Application No.: 09/600,888 Examiner: Hoa B. TRINH

Filed: August 15, 2000 Attorney Docket No.: 107242-00005

For: LIGHT EMITTING DIODE AND FABRICATION PROCESS THEREFOR

DECLARATION UNDER 37 C.F.R.§ 1.132

I, Kingo Suzuki, do hereby declare as follows:

1) I am an inventor of the above-identified U.S. patent application.

2) In order to demonstrate the difference between the roughened surfaces of the present invention with the roughened surface of Wegleiter et al., I provide the following experimental results.

3) The process of surface roughening according to Wegleiter is described in the Wegleiter specification, at col. 3, lines 55-68. The surface roughening of Wegleiter consists of two etching steps:

a. The first step etching:

Solution Composition	H_2SO_4:H_2 O_2:H_2O(3:1:1)
Solution Temperature	15-80 degrees Celsius (preferably 25 degree Celsius)
Etching Time	30 seconds to 10 min.

b. The second step etching:

Solution Composition	HF
Solution Temperature	15-30 degrees Celsius
Etching Time	30-120 minutes

4) Figures 1-8 of Exhibit A illustrate the results of performing the process outlined above on a GaAsp wafer. In Figs. 1-4, the side edges of the wafer are illustrated using a scanning electron microscope at 12 kV, 10 μm width, and 2000x magnification. In Figs. 5-8, the front side of the wafer is illustrated using a scanning electron microscope at 15 kV, 1 μm width, and 5000x magnification.

5) The process of roughening according to the present invention is described on page 8, line 23, to page 9, line 25, and also includes two steps:

a. The first step etching:

Solution Composition	H_2SO_4:H_2O_2:H_2O(3:1:1)
Solution Temperature	Unspecified
Etching Time	2 minutes

b. The second step etching:

Solution Composition	Br_2/HF/HNO_3/CH_3COOH or I_2/HF/HNO_3/CH_3COOH
Solution Temperature	30 degrees Celsius
Etching Time	75 seconds.

6) Figures 1-2 in Exhibit B illustrate the results of performing the process recited in the present invention on a GaAsP wafer. In Fig. 1, the front side of the wafer is illustrated using a scanning electron microscope at 15 kV, 10μm width, and 5000x magnification, the same that was used in Figs. 1-4 of Exhibit A. In Fig. 2, the front side of the wafer is illustrated using a scanning electron microscope at 15 kV, 1μm width, and 5000x magnification, the same that was used in Figs. 5-8 of Exhibit A.

7) The figures clearly and plainly illustrate to me, and to any other observer, that the process described in Wegleiter, and the process recited in the claimed invention, result in substantially different surfaces which are not substitutable or interchangeable.

I hereby declare that all statements made herein of my own knowledge are true, were made with the knowledge that willfully false statements made are punishable be fine, or imprisonment, or both, under 18 U.S.C. § 1001, and that such statements may jeopardize the validity of this application and patent issuing thereon.

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Kingo Suzuki

March 26, 2007

Date

Enclosures: Exhibit A
Exhibit B

A comparative experiment between Wegleiter et al. (US6,531,405) and the present invention

A frost processing (surface roughening) experiment of GaAsP (VPE-Yellow)

1.The retesting experiment of a frost processing (surface roughening) of the method disclosed in Wegleiter et al.

(1) Pretreatment Solution Composition $H_2SO_4:H_2O_2:H_2O=3:1:1$ Solution Temperature 25℃
Treatment Time 1 minite

(2)Frost Processing Solution Composition HF(50%) Solution Temperature 18～19℃
Treatment Time 30, 60, 90, 120minutes

2. Result --- Please see the photos shown below. There is no frost-shaped surfaces (there is no roughened surfaces).

Exhibt A.
SEM(Scanning Electron Microscope) photos taken from the edges of wafer.

Fig. 1

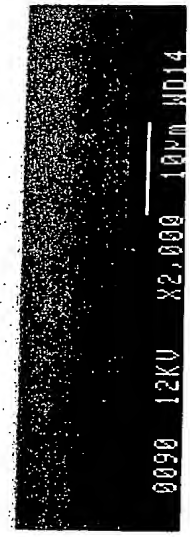
HF(50%) Treatment Time 30minutes

Fig. 2 (Edges of wafer)

Front ← → Side surface

HF(50%) Treatment Time 60 minutes

Fig. 3

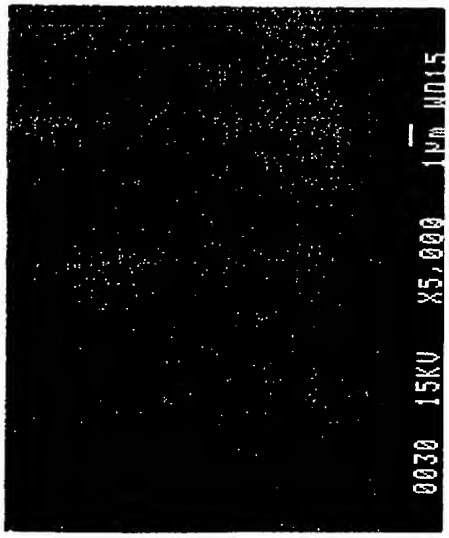


HF(50%) Treatment Time 90minutes

Fig. 4

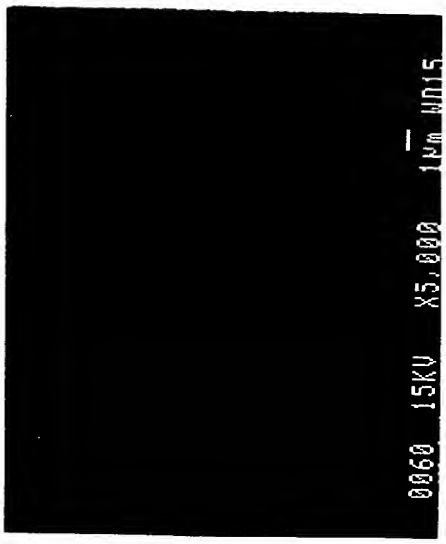
HF(50%)Treatment Time 120minutes

Fig. 5
SEM photos from directly above wafer.



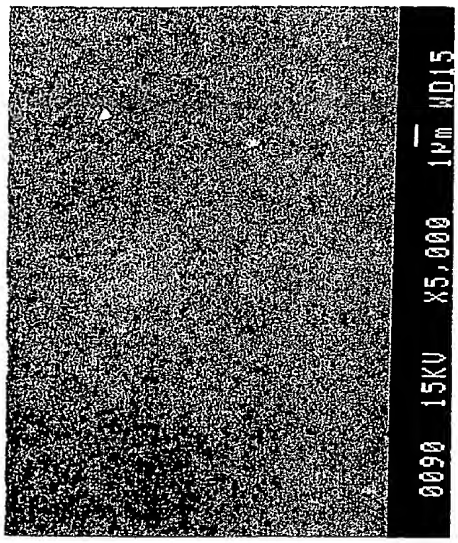
HF(50%) Treatment Time 30minutes

Fig. 6



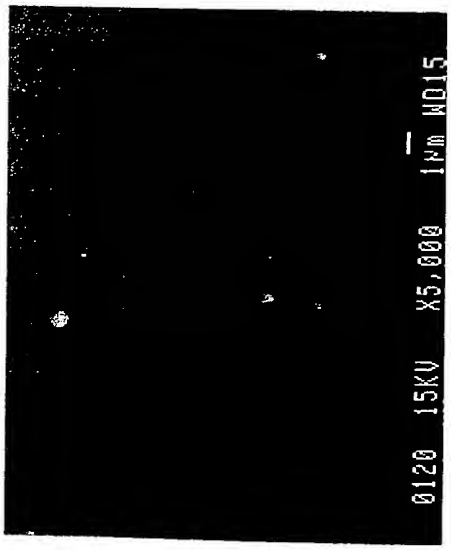
HF(50%) Treatment Time 60minutes

Fig. 7



HF(50%) Treatment Time 90minutes

Fig. 8



HF(50%) Treatment Time 120minutes

Exhibit B.
SEM photos shows chip surfaces after a frost processing by the solution composition of the present invention.
A frost (surface roughening) state of GaAsP(VPE-Orange).

Fig. 1

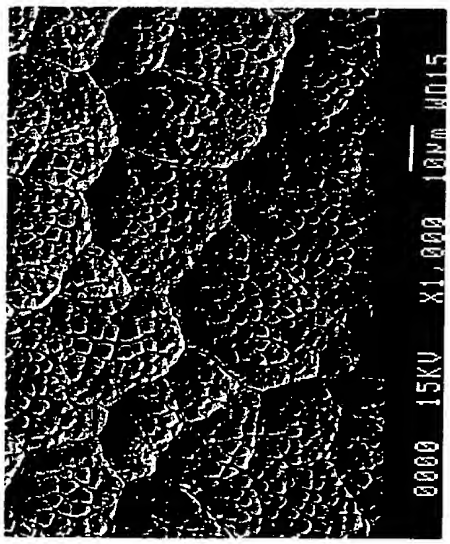
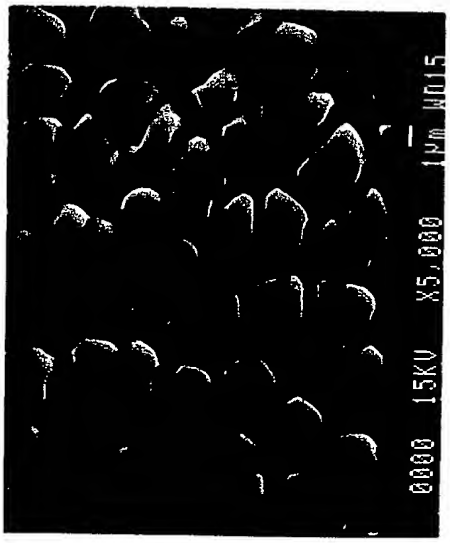


Fig. 2



3. Conclusion
There are remarkable differences between the roughened surface according to the present invention and the roughened surface accrding to Wegleiter et al.
The roughened surface according to Wegleiter et al. does not have the feature that section arc-shaped projections on the air side are gathered.